Hasan Guclu - Curriculum Vitae

Contact Information

Center for Nonlinear Studies
Theoretical Division
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Research Interests

— Complex systems: Synchronization, Internet, social networks
— Communication networks: Peer-to-peer networks, sensor networks
— Large-scale data analysis and modeling
— Extreme-value statistics in complex systems
— Computational epidemiology and ecological simulations
— Condensed matter physics: Network modeling in nano-structure growth
— Nonlinear dynamics: Nonlinear oscillator chains, breather formation

Education

Rensselaer Polytechnic Institute, Troy, New York, USA

Ph.D., Statistical Physics, August 2005

- Dissertation Topic: "*Synchronization in Small-World-Connected Computer Networks*"
- Adviser: György Korniss

Middle East Technical University (METU), Ankara, Turkey

M.S., Physics, January 2001

- Thesis Topic: "*Formation and Evolution of Breathers in a Chain of Nonlinear Coupled Oscillators*"
- Advisers: Vladimir Mirnov and Sinan Bilikmen

METU, Ankara, Turkey

B.S., Physics, July 1998

Work Experience

Los Alamos National Laboratory, Los Alamos, New Mexico, USA
Director-Funded Postdoctoral Fellow **October 2005 – present**

Rensselaer Polytechnic Institute, Troy, New York, USA
Graduate Research Assistant **May 2001 – July 2005**

Los Alamos National Laboratory
Summer Intern, Complex Systems Group **June – August 2003**
Summer Intern, Center for Nonlinear Studies **June – August 2002**

PBSistem Software Inc., Ankara, Turkey
Project Manager/Database Application Developer **July 1998 – July 2000**

Teaching and Mentoring

Los Alamos National Laboratory
Mentor/Adviser **2006 – 2007**

Mentored L. O'Malley (Physics, Rensselaer Polytechnic Institute) and A. Baykal (Computer Science, University at Albany).

METU, Ankara, Turkey
Graduate Teaching Assistant **September 1998 – April 2001**
Taught freshman physics laboratory courses such as mechanics and electrostatics

National Physics Olympiads, Ankara, Turkey
Coach/Tutor for Physics Olympiads Team **1992 – 1997**
Taught all basic physics courses to high school students who are candidates for the Physics Olympiads Team

Honors, Awards and Memberships

Selected for Marquis Who's Who of Emerging Leaders (2007)
Judge in LANL Student Symposium (2007)
Judge in New Mexico Supercomputing Challenge (2007)
Organizer of the 26^{th} CNLS Conference on Socio-Technical Systems (2006)
Travel Grant from Isaac Newton Institute for Mathematical Sciences, Cambridge, UK (2006)
Los Alamos Director's Funded Postdoctoral Fellowship (2005)
Travel Grant from NSF for the ITR Workshop, Illinois (2004)
Rensselaer Founder's Award of Excellence (2003)
Elected member of Sigma Pi Sigma Honor Society RPI Chapter (2002)
METU Fellowship (merit based, 1993–1996)
METU Department of Physics Fellowship (merit based, 1993–1995)
Turkish Scientific and Technical Research Council Fellowship (merit based, 1993–1995)
METU Dean's List (1993, 1998)
Participant in the International Physics Olympiads, Helsinki, Finland (1992)
National Physics Olympiads, 1^{st} place, Ankara, Turkey (1991)
Exhibitor for Young Inventors Competition, Ankara, Turkey (1991)
Member of American Physical Society (APS)
Member of The Institute of Electrical and Electronics Engineers (IEEE)

Publications

19. H. Guclu, G. Korniss, C.J. Olson Reichhardt, C. Reichhardt, and Z. Toroczkai, "Regimes of Kinetic Roughening in Distance-Dependent Small-World Networks", in preparation.

18. L. O'Malley and H. Guclu, "Epidemics Dynamics on Limited Scale-Free Networks", in preparation.

17. S. Boettcher, B. Gonçalves, and H Guclu, "Hierarchical, Regular Small-World Networks", submitted.

16. H. Guclu and M. Yuksel, "Limited Scale-Free Overlay Topologies for Unstructured Peer-to-Peer Networks", Submitted to IEEE Transactions on Parallel and Distributed Systems.

15. M. Yuksel , T. Karabacak , H. Guclu, "Networking Behavior in Thin Film and Nanostructure Growth Dynamics", *2^{nd} IEEE International Conference on Nano-Networks* (2007). [peer-reviewed]

14. H. Guclu, G. Korniss and Z. Toroczkai, "Synchronization and extreme fluctuations in noisy task-completion landscapes", *Chaos* **17**, 026104 (2007).

13. H. Guclu and M. Yuksel, "Scale-Free Overlay Topologies with Hard Cutoffs for Unstructured Peer-to-Peer Networks", *Proceedings of the 27^{th} IEEE International Conference on Distributed Computing Systems*, p. 32 (2007). [peer-reviewed, 14% acceptance rate]

12. Z. Toroczkai and H. Guclu, "Dynamic Proximity Networks", *Physica A* **378**, 68 (2007).

11. H. Guclu, G. Korniss, M.A. Novotny, Z. Toroczkai, and Z. Rácz, "Synchronization Landscapes in Small-world-connected Computer Networks", *Physical Review E* **73**, 066115 (2006).

10. Z. Toroczkai, G. Korniss, M. A. Novotny, and H. Guclu, "Virtual Time Horizon Control via Communication Network Design" in *Computational Complexity and Statistical Physics*, edited by A. Percus, G. Istrate, and C. Moore, a volume of Santa Fe Institute Studies in the Sciences of Complexity Series (Oxford University Press, New York, 2006).

9. H. Guclu and G. Korniss, "Extreme Fluctuations in Small-world-coupled Autonomous Systems with Relaxational Dynamics", *Fluctuations and Noise Letters* **5**, L43 (2005).

8. H. Guclu and G. Korniss, "Extreme Fluctuations in Small-Worlds with Relaxational Dynamics", *Physical Review E* **69**, 065104(R) (2004).

7. S. Eubank, H. Guclu, V.S.A. Kumar, M. Marathe, A. Srinivasan, Z. Toroczkai, and N. Wang, "Controlling Epidemics in Realistic Urban Social Networks", *Nature* **429**, 180 (2004).

6. H. Guclu and G. Korniss, "Extreme Fluctuations in Small-worlds with Relaxational Dynamics", Noise in Complex Systems and Stochastic Dynamics II (Invited Paper), *Proceedings of SPIE (The International Society for Optical Engineering)* **5471** (2004) [peer-reviewed]

5. H. Guclu, G. Korniss, Z. Toroczkai, and M.A. Novotny, "Small-World Synchronized Computing Networks for Scalable Parallel Discrete-Event Simulations", *Lecture Notes in Physics by Springer* **650**, 255 (2004).

4. G. Korniss, M.A. Novotny, H. Guclu, Z. Toroczkai, and P.A. Rikvold, "Suppressing Roughness of Virtual Times in Parallel Discrete-Event Simulations", *Science* **299**, 677 (2003).

3. G. Korniss, M.A. Novotny, A.K. Kolakowska, and H. Guclu, "Statistical Properties of the Simulated Time Horizon in Conservative Parallel Discrete-Event Simulations" *Proceedings of ACM Symposium on Applied Computing*, Madrid, Spain (2002) [peer-reviewed]

2. G. Korniss, M.A. Novotny, P.A. Rikvold, H. Guclu, and Z. Toroczkai, "Going through Rough Times: From Non-Equilibrium Surface Growth to Algorithmic Scalability", *Proceedings of the Materials Research Society*, **701**, Boston, MA (2001) [peer-reviewed]

1. V.V. Mirnov, A.J. Lichtenberg, and H. Guclu, "Chaotic Breather Formation, Coalescence and Evolution to Energy Equipartition", *Physica D* **157** (2001).

Seminars Presentations

Invited Talk: *"Limited Scale-Free Networks for Unstructured Peer-to-Peer Networks"*, Center for Nonlinear Studies Postdoc Lectures, Los Alamos, NM (September 2007).

Invited Talk: *"Scale-Free Overlay Topologies with Hard Cutoffs for Unstructured Peer-to-Peer Networks"'*, IEEE International Conference on Distributed Computing Systems, Toronto, Ontario, Canada (June 2007).

Invited Talk: *"Task-Based Synchronization in Complex Noisy Networks"*, Workshop on Algorithms, Inference, and Statistical Mechanics, Santa Fe, NM (May 2007).

Contributed Talk: *"Dynamic Proximity Networks"*, APS March Meeting, Denver, CO (March 2007).

Invited Talk: *"Synchronization and Extreme Fluctuations in Noisy Task-Completion Networks"*, Center for Nonlinear Studies Postdoc Lectures, Los Alamos, NM (March 2007).

Invited Talk: *"Synchronization and Extreme Fluctuations in Noisy Task-completion Landscapes"*, Condensed Matter Physics Seminars, Department of Physics, University of Notre Dame, Notre Dame, IN (January 2007).

Poster: *"Synchronization in Small-World Networks"*, Dynamics Days 2007, Boston, MA (January 2007).

Poster: *"Synchronization in Small-World Networks and Applications to Scalable Parallel Discrete-Event Simulations"*, Los Alamos Computer Science Institute Symposium, Santa Fe, NM (October 2006).

Contributed Talk: *"Extreme Fluctuations in Small-world-coupled Autonomous Systems with Relaxational Dynamics"*, Workshop on First-Passage and Extreme Value Problems in Random Processes, Cambridge, UK (June 2006).

Contributed Talk: *"Statistics of Extreme Fluctuations in Small-World Synchronized Computing Networks"*, Workshop on Optimization in Complex Networks, Los Alamos, NM (May 2006).

Invited Talk: *"Synchronization Landscapes in Small-World-Connected Computer Networks"*, Center for Nonlinear Studies Postdoc Lectures, Los Alamos, NM (January 2006).

Contributed Talk: *"Slow Convergence to the Asymptotic Steady-state Width Distribution in a 2D Kardar-Parisi-Zhang (KPZ) Surface"*, Fifth Greater Boston Area Statistical Mechanics Meeting, Boston, MA (October 2004).

Poster: *"Modeling Disease Outbreaks in Realistic Urban Social Networks"*, NSF Division of Materials Research ITR Computational Workshop, IL (June 2004).

Contributed Talk: *"Statistics of Extreme Fluctuations in Small-World Synchronized Systems"*, APS March Meeting 2004, Montreal, Canada (March 2004).

Contributed Talk: *"Extreme Statistics in Small-World Synchronized Networks"*, 90th Statistical Mechanics Conference, Rutgers University, NJ (December 2003).

Contributed Talk: *"Extreme Value Distributions in Small-World Synchronized Systems"*, Fourth Greater Boston Area Statistical Mechanics Meeting, Boston, MA (October 2003).

Poster: *"Stochastic Growth in Small-World and Applications to Scalable Parallel Discrete Event Simulations"*, 23rd Annual International Conference on Networks organized by Center for Nonlinear Studies (Los Alamos National Laboratory), Santa Fe, NM (May 2003).

Invited Talk: *"Six Degrees of Separation and Small World"*, RPI Department of Physics Journal Club, A PGSC Event, Troy, NY (February 2003).

Contributed Talk: *"Stochastic Growth in Random Networks"*, Fourth Greater Boston Area Statistical Mechanics Meeting, Boston, MA (October 2002).

Invited Talk: *"Analysis of EPISIM Data"*, EPISIM Meeting in Los Alamos National Laboratory D-2 Division, Los Alamos, NM (July 2002).

References

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